
XXV. *Remarks on Dr. Roxburgh's Description of the Monandrous Plants of India; in a Letter to the President.* By William Roscoe, Esq. F.L.S.

Read February 1, 1814.

DEAR SIR,

I HAVE just received the eleventh volume of the Asiatic Researches, containing Dr. Roxburgh's *Description of the Monandrous Plants of India*, which I have perused with great interest. It was, indeed, reasonably to be expected that the observations of so experienced a Botanist, founded on an actual inspection of the living plants, in their native climate, must be highly valuable; and in this, his readers will not be disappointed. Independent of the additional light thrown upon subjects that have already been inquired into, and which has cleared up difficulties that could not otherwise have been removed, we find many new and splendid plants, now first introduced to our notice, accompanied by such descriptions and illustrations as induce us to hope that, by a further perseverance, this portion of the vegetable kingdom, which was left in the greatest disorder by both Linnæus and Jussieu, will at length be thoroughly understood.

Dr. Roxburgh is, however, still of opinion, that the interior divisions of the corolla in scitamineous plants, may be advantageously employed in ascertaining the essential character; and he has accordingly resorted to them for his leading distinctions of the genera, not indeed without occasionally employing those derived
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from the more immediate parts of fructification. That distinctions founded on the corolla may occasionally be of use, even in determining the genus, I shall not deny; but that any distinctions which can be derived from a corolla, which is strictly speaking monopetalous, can be so described as to characterize the many genera of which this order is composed, I greatly doubt; and the ineffectual attempts that have been heretofore made for that purpose may be allowed to justify such distrust. On the other hand, the distinctions founded on the anthera and its filament, are not only characteristic and permanent, but are sufficiently various and distinct to extend throughout the whole order, and to assign to each genus its proper situation. That these distinctions are confirmed by many others, as well from the sections and form of the corolla, as from the general growth and habit of the plant, is certain; but as these peculiarities have not been found sufficient to lay the foundation of an intelligible and entire arrangement, they must always be considered in a subordinate light; in which, however, they may occasionally be found of considerable use.

With these preliminary remarks, I shall now proceed briefly to point out such parts of Dr. Roxburgh's valuable Paper as seem to me to require observation; being well convinced that, from the interest you take in this subject, any apology for the trouble I may give you will be unnecessary.

Of *Canna*, it appears the garden at Calcutta possesses but one species, the *Indica*, of which, we are informed, the red and yellow varieties are common in every garden in India. I shall, however, take this opportunity of contributing, as far as in my power, towards the elucidation of this genus, which, as you have observed in *Exotic Botany*, (page 83,) wants a thorough investigation. The species may be divided into two sections; 1. C. with the

the segments of the corolla, linear-lanceolate, erect; these have uniformly red, or variegated red and yellow flowers; and 2. C. with the segments of the corolla broad and ovate; with pale-yellow or sulphur-coloured flowers. In the former may be enumerated the *Indica*, *coccinea*, and *lutea* of the *Hortus Kewensis*; specimens of the two latter of which were sent by Lord Seaforth, when he was Governor of Barbadoes, to the Botanic Garden at Liverpool, where they continue to flower abundantly. In the same section must also be included the *patens* of the *Hort. Kewensis*; which differs from the rest of this section not only in the greater magnitude of the corolla, but in the lip of the nectary; which in the *Indica*, &c. is entire, spatulate, revolute; but in the *patens* is irregular and emarginate, resembling a section of the corolla. This plant has flowered in the Botanic Garden at Liverpool, and is undoubtedly the same as that grown at Sion House, under the name of *latifolia*. The second section contains the *glauca* and *flaccida*, the former of which you have figured in *Exot. Bot.*, tab. 102; and which, as you justly observe, is a most distinct species from the *cannacorus* of the *Hort. Eltham.* tab. 59, which is certainly the *flaccida*. There will still remain the *paniculata* and *iridiflora* of the *Fl. Peruviana*, and the *juncea* of Retz, which I have not at present an opportunity of ascertaining.

Omitting *Maranta* and *Thalia*, Dr. Roxburgh next proceeds to *Phrynium*, of which his full description (with his excellent figure of *P. capitatum*) has enabled us to form a decisive opinion. That this plant is the same as that of Van Rheedé (*Hort. Mal.* xi. tab. 34) cannot admit of a doubt; and thus a figure, which has been a sort of common reference for whatever could not be found elsewhere; the *Pontederia ovata* of Linnæus, the *Myrosma cannaefolia* of Gmelin, the *Phyllodes placentaria* of Loureiro, has at length found its proper appellation. To this genus Dr. Roxburgh has added

added two other species, *dichotomum* and *virgatum*; but I am inclined to believe that both these plants, if not already known to us, will be found on investigation to belong to other genera. Dr. Roxburgh, indeed, admits that the habits of his three species of *Phrynium* are different, although he conceives they agree in their generic character; but I have commonly found the true generic distinctions confirmed by the habit of the plant, and am doubtful when this is not the case.

That the three genera of *Maranta*, *Thalia*, and *Phrynium* are nearly allied to each other, is I think evident, as appears more particularly by the seed, in which the albumen of the nuciform fruit is pierced by the thread-like embryo; yet their generic distinctions, as well as their habits, seem to require their separation. In *Maranta* the anthera is irregularly placed on the margin of the petal or petal-like filament: sometimes on the right, and at others on the left; but the edge, where the anthera is found, is always thickened downwards, as if by a concealed stamen; and in some instances this stamen is even separated from the petal, for a very short distance, immediately below the anthera. In *Thalia* the anthera is placed in the middle of its proper filament, opposite to which is the short style, terminating in an irregular ringent stigma, resembling the mouth of a beaker, and wholly different from that of any other genus in the whole order. In *Phrynium*, the anthera is placed in front of a strong arched or inflexed filament, in such a manner, that if it were erect, the anthera would appear to be attached to the back, whilst the stigma is simply funnel-shaped, in which it agrees with the chief part of the scitaminean tribe. These distinctions, in themselves so important, are confirmed by the respective habits of the plants; that of *Maranta* being ramose, and frequently dichotomous; *Thalia* flowering terminally on a long stem from the
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centre of the leaves; and *Phrynium* having no stem whatever, its inflorescence bursting from the petiole of the floral leaf.

With Retzius and Jussieu, Dr. Roxburgh was long induced to consider *Hedychium* as a species of *Kæmpferia*, but is now led to believe it a distinct genus; for which he has given additional reasons to those which I had before adduced. Of this beautiful genus only one species is known*, which has long been in this country, and of which there is a good figure in your *Exotic Botany*, tab. 107.

To the three species of *Kæmpferia* already described, Dr. Roxburgh has added another, *K. pandurata*; for which, he observes, he could almost wish to quote the *Manja-Kua* of Rheede, *Hort. Mal.* xi. tab. 10. referred to by Linnæus, as *Curcuma rotunda*. That Dr. Roxburgh might have cited this figure for the *pandurata*, I have not the least doubt. The only distinctions that appear to subsist between that and the figure which he has given, are in the form of the leaf, and of the upper lip of the nectary; and these differences it will not be difficult to reconcile. In fact, it clearly appears, from comparing Dr. Roxburgh's figure with that in the *Hort. Mal.* that the *K. Ovata*, in p. 22 of my arrangement, is the *pandurata* of Dr. Roxburgh. My description was taken from the figure of Van Rheede, where the nectary appears to be pointed; but at the time that work was published, minute botanical distinctions were not sufficiently attended to; and the lip, though ovate, might, if viewed aside, take that appearance. On comparing the leaves as given in the two figures, I find them nearly to agree; and the plants are so similar in their general habit, that I have not the least hesitation in withdrawing the specific appellation of *Ovata*, for the more appropriate one of

* Four more are described by Sir J. E. Smith in Rees's Cyclopædia, the *ellipticum*, *spicatum*, *thyrsiforme* and *coccineum*, all found by Dr. Buchanan in Nepaul.

pandurata,

pandurata. At the same time I have great pleasure in finding that the plant figured by Van Rheede, which had been classed as a *Curcuma*, but which I conjectured to be a *Kæmpferia*, is found, on such indisputable authority, to belong to that genus.

If the foregoing remarks be well founded, few if any additions are in fact made by Dr. Roxburgh to the species of any of the preceding genera; but this is amply compensated in the genus *Curcuma*, which, as he remarks, are the most easily distinguished of all the scitaminean tribe, and of whose habit, growth, and inflorescence he has given a very full and satisfactory account. Of this genus Dr. Roxburgh describes fourteen species; eleven of which appear to be now first ascertained. In his arrangement of them some difficulties, however, present themselves. For his first sp. *C. zedoaria*, he refers to Willdenow, vol. i. p. 7, *Amomum zedoaria*, on a reference to which we find the *Hort. Mal.* xi. 7. cited for a figure of the plant, which Willdenow has characterized by the epithet *bona*; and as there is no other figure or author referred to by Dr. Roxburgh, we may presume the plant to be ascertained beyond a doubt. But on proceeding to his next species, *C. zerumbet*, we find the same plate of the *Hort. Mal.* xi. tab. 7, referred to by Dr. R. as a figure of this plant also; a circumstance which leaves us still in doubt as to which of the two plants is there represented. For a further explanation as to his *Zerumbet*, Dr. Roxburgh has referred us to the figure in Rumphius *Hort. Amboyn.* v. tab. 68.; but this, again, is the very figure to which Willdenow has referred (with a query) for his *Zedoaria*. In order to clear up this difficulty, we must have recourse to other authorities, and fortunately these will furnish us with sufficient materials for that purpose. Mr. Salisbury, in his *Paradisus Londinensis*, has described four species of *Curcuma* cultivated in this country; viz. 1. *Longa*, figured in the *Hort. Vindob.* of Jacquin. 2. The true *Zedoary*, accurately

rately distinguished by Father Kamel, the leaves of which are smooth, with a large purple cloud on their upper surface. 3. A plant with smooth leaves, the petioles of which only are purple: and 4. The plant figured in the *Paradisus*, with leaves entirely green, pubescent underneath. Now the most striking distinction noticed by Dr. Roxburgh in the habit of his two species is, that in *Zedoaria* the leaves are sericeous underneath, and the whole plant is green; whilst, in his *Zerumbet*, there is constantly a ferrugineous mark down the centre of the leaves. Hence it clearly follows, that the *Zerumbet* of Roxburgh is the *Zedoaria*, or No. 2 of Salisbury; and that the *Zedoaria* of Roxburgh is the 4th of Salisbury, figured in the *Paradisus* under the name of *Aromatica*; both of them being entirely green, and the leaves sericeous or pubescent beneath. Both these plants are in the Botanic Garden at Liverpool, and agree perfectly with the descriptions given of them.

From this statement I presume to think that the specific appellation of *Zedoaria* should have remained with the plant to which it has always been attached; viz. that with the marked or clouded leaf, and which Dr. Roxburgh himself expressly states is the plant which produces the *Zedoary* of the shops in England; whilst the specific name of *Zerumbet*, as applied to a species of *Curcuma*, should be abolished, and that of *Aromatica*, already given by Salisbury, retained in its stead. This seems the more necessary, as the *Amomum Zerumbet* of Linn. and Willd. is not a *Curcuma*, but a *Zingiber*. The *Curcuma Zedoaria* figured in the *Bot. Mag.*, No. 1546, the leaf of which appears to be accidentally variegated with white spots, is probably also the true *Zedoary*, and a different plant from that figured in the *Paradisus*. The synonym, however, in the *Bot. Mag.* should have been to the *Zerumbet* of Roxburgh, and not to the *Zedoaria*.

Of *Amomum* there appear to be in the garden at Calcutta only four species; two of which, the *Cardamomum* and *Angustifolium*, are already distinctly known. The *Aculeatum* and *Maximum* of Roxburgh appear, from their echinated capsules, to resemble the *Globba crispa*, *viridis*, and *rubra* of Rumph. *Amb.* vi. 60, 61; but Dr. Roxburgh conceives them to be different plants.

Of the genus *Zingiber* Dr. Roxburgh has given nine species, only four of which have before been described. Of the remainder, there are two, the *capitatum* and *marginatum*, which are said to flower from a terminal spike; a mode of inflorescence so entirely different from that of the rest of the genus, which is an imbricated radical scape, as to induce a doubt whether they may not be found, on further investigation, to belong to some other genus.

Amongst the additions made by Dr. Roxburgh to *Zingiber*, I have not included the *Z. Cassumunar*, although he has affixed to it the letter R. in the same manner as to the other newly described plants; this being already known in Europe, and described in my Paper on Scitamineæ in the *Linn. Trans.* under the name of *Z. purpureum*. It flowered in the Liverpool Botanic Garden in the year 1810; and the drawing then made of it perfectly agrees with the excellent figure given by Dr. Roxburgh. At that time I was not aware that this plant was the *Cassumunar* of the shops, which has now been ascertained by Sir Joseph Banks and Dr. Coombe. The specific name of *purpureum* should therefore be withdrawn, and the more determinate one of *Cassumunar* retained. The figure given in Andrews's *Bot. Repository*, pl. 555, under the name of *Z. Cliffordia*, is the same plant, which has also been since figured in the *Bot. Mag.* No. 1426, under its proper name, on the authority of Dr. Roxburgh.

Of *Costus*, Dr. Roxburgh has described only one species, the *Speciosus*; and even this is not so clearly defined as to be free

from doubt. He has indeed referred to your authority (*Trans. Linn. Soc.* i. 249,) and has quoted the figure in Rheede, *Hort. Mal.* xi. 8.; but on referring to your Paper, I find this figure cited by you with a query; and subsequent discoveries have shown that your doubt was well founded. Why was not the reference made to the *C. Arabicus* of Jacquin, (*Pl. Rar. tab.* i.) "whose magnificent figures and full description," as you justly observe, "render all further observations unnecessary?" The figure of Van Rheede is very different, and is probably the true *Costus Arabicus*; it appearing, on the authority of Sir Joseph Banks, communicated to Dr. Roxburgh, that the root of the *Speciosus* does not at all resemble the *Costus Arabicus* of the shops.

Of eight species of *Alpinia* described by Dr. Roxburgh, six are already known, both by descriptions and figures. Of the other two, we are informed that *A. mutica* is an elegant species, and holds a middle rank between *nutans* and *calcarata*, and that *spicata* is the smallest of the species that Dr. Roxburgh had seen.

Among the above six plants already known, is the *Amomum repens* of Sonnerat, figured in *Hort. Mal.* xi. *tab.* 4 and 5; which Dr. Roxburgh has now included in *Alpinia*, under the name of *A. cardamomum*. For this arrangement, I am far from presuming that plausible reasons may not be given, although Dr. Roxburgh has not stated them. The fact is, that this plant has been attended with greater difficulty in deciding on its genus than any other in the whole order. In my Paper on *Scitamineæ*, in the *Linn. Trans.*, where this plant is given on the authority of Sonnerat and Willdenow, under the name of *Amomum repens*, I have recorded in a note the opinion with which you favoured me, that "this plant, which affords the common lesser *Cardamum* of the shops, is really an *Alpinia*." It must, however, be allowed, that between this and the other plants included in that genus, there
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exist some striking diversities ; and that in particular, as Dr. Roxburgh observes, “ all the *Alpinia* (except this) terminate in a copious raceme or panicle of large gaudy flowers ;” whereas this flowers in a procumbent panicle, immediately from the root or base of the stem. Thus, whilst its parts of fructification in some respects resemble an *Alpinia*, its habit connects it more nearly with *Amomum*. On this account I am induced to agree with Dr. Maton, in his observations in the *Linn. Trans.* vol. x. p. 249, in establishing this as a new genus, under the name of *Elettaria*. The very full description and explicit figures given of it by Mr. White, Surgeon of the Bombay Establishment*, will now sufficiently enable us to discriminate this from every other genus in the order. If, however, the generic distinction be well founded, it must exist not only in the habit of the plant, but in its inflorescence and parts of fructification, and especially in its anther-bearing filament, which, as you have justly observed, (*Exot. Bot.* ii. 86,) “ is the only principle upon which natural genera in this order can be founded.” I have accordingly attentively considered Mr. White’s figures and description ; and after comparing them with those of Van Rheedé, and with the essential characteristics of the other genera in the order, find a most striking peculiarity in the conformation of the filament, which rises from the germen, and is connate with the petals and style, but extends in a cylindrical form beyond the diverging of the petals, till it expands into two horizontal appendages or hornlets ; after which the filament is continued only by a short erect linear process, forming a sort of proper stamen, and bearing on its edges, at the upper extremity, the double anthera. The lobes of this anthera, as is usual in the true *Scitamineæ*, embrace the style, which is inclosed and conveyed by the cylindrical tube till it rises within a

* *Trans. Linn. Soc.* vol. x. p. 248.

very short distance from the anthera: *vol. x. tab. 5. fig. 4, 5, 6.* These characteristics seem to me to separate the *Elettaria* from every other genus; the hornlets not being attached to the base of the larger petal or nectarium, as in *Alpinia*, where they seem to perform the office of honey-cups, but being, as in *Amomum*, a simple process of the filament, of no perceptible use in the œconomy of the plant, and contributing merely an additional feature to its discrimination.

To the fine genus of *Alpinia*, it is not improbable that considerable additions may yet be made. In a splendid collection of Chinese drawings, belonging to the Right Hon. Lord Stanley, F.L.S. I find figures of three species, which appear to me to be undescribed, although they equal in beauty any of those hitherto known. The drawings, as usual in Eastern figures, are not accompanied by dissections of the plants; but such an account of them as can be given will not, I flatter myself, be uninteresting to you.

Of the first of these, the inflorescence is terminal and pendulous; the calyx or exterior petal short and pointed; the interior or nectarium, broad, simple, emarginate; its colour bright yellow, regularly streaked with crimson; filament simple, the stigma just appearing beyond the termination; leaves lanceolate, regularly nerved, margins simple, and like some others of the species, the unfolded blossoms have the appearance of fine China-ware, (*Alpinia pennicellata*.)

The second of these varies greatly from any of the order hitherto known, and may perhaps constitute a new genus. The inflorescence is terminal, inclining, but not pendulous; the calyx or exterior petals ovate; nectarium flat, broad, panduriform, colour bright yellow, with a mid-rib or nerve through the middle, from which diverge crimson streaks; leaves lanceolate, glaucous below,
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the margin strongly nerved. But the part by which this plant is peculiarly distinguished is the filament, which is deeply cloven to the base, so as to form two distinct processes, each of them crowned with its proper anthera, between which rises the style, perfectly free, and not inclosed by a double anthera, as in the rest of the perfect *Scitamineæ*. In other respects this plant appears to be so truly an *Alpinia*, that I am inclined to retain it in the genus under an appellation characteristic of its divided filament (*Alpinia diffissa*.)

In the third of these figures, the calyx is concave, ovate; nectarium broad, flat, nearly circular, but deeply indented on each side of the lip, so as to form three nearly equal sections; colour yellow, with purple rays diverging from its base, where it is spurred; filament simple, terminating in an ovate summit. Stem jointed, inclined to spiral, leaves downy, petioles of the upper ones uniting with the bractes. The habit of the plant is rather that of a *Costus* than an *Alpinia*; but the inflorescence is a loose panicle, and not a bracteated spike, and the whole construction of the corolla seems decisive of the genus. (*Alpinia bracteata*.)

Perhaps no genus in the whole vegetable system has been involved in greater confusion than *Globba*. It is to you, as Dr. Roxburgh has already observed, that we are indebted for the correction of those errors, by which the genus is now as clearly defined, as any of the scitaminean plants. Of this, it appears, there are in the garden at Calcutta six species. 1. The *Marantina*, figured in your *Exot. Bot. tab.* 103. 2. *Bulbifera*, a new species, unless it be the *Sessiliflora*, figured in the *Bot. Mag.* No. 1428, which Dr. Sims thinks probable. Of the 3d, *Orixiensis*, Dr. Roxburgh has given a good coloured figure. For his 4th, *G. Hura*, he has cited the *Hura Siamensium* of Retz, (*Obs. Fas.* iii. p. 49,) which Willdenow conjectured to be an *Alpinia*, but which you have ascertained and described from a sketch in the possession of

Sir

Sir Joseph Banks. The 5th, *Globba pendula*, is certainly a new species in this country. The 6th, *Radicalis*, appears to have been sent to this country by Dr. Roxburgh, where it has flowered with Sir Abraham Hume at Wormleybury, and has been figured in *Bot. Mag.*, No. 1320, under the name of *Mantissa Saltatoria*; and by Andrews, *Bot. Rep.* 615, under that of *Globba purpurea*. If to these six species we add the *Globba racemosa*, figured in *Exot. Bot. tab.* 117, we shall, I presume, have all the species yet known of this very singular genus.

One of the plants before mentioned, the *Globba radicalis*, differs from the rest of the genus in the manner of its inflorescence, which is radical, and not terminal; a circumstance which has induced Dr. Sims to consider it as a distinct genus. This diversity, however, is found to be supported by others not less decisive, and which he has also noticed, arising as well from the laciniae of the corolla, as from the large petal-like bractes placed at each division of the scape; but the part which appears to me to be the most conclusive, is found in the two long filiform appendages at the base (or, according to Andrews, the middle) of the filament, which are not met with as far as my inquiries extend in any true species of *Globba*, and which, upon the principles laid down in my former arrangement, must be allowed to be sufficient to characterize this as a distinct genus.

I have thus, perhaps at too great length, endeavoured to lay before you, not only the observations suggested to me by the perusal of Dr. Roxburgh's valuable Paper, but also such remarks as have occurred to me on the subject since my former communication to the Society.

I am, &c.

W. R.

Allerton,
6th Jan. 1814.